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John F. Kennedy Space Center

KSC managers visit East Texas recovery team

Kennedy Space Center Director Roy Bridges Jr. and a group of senior NASA and contractor managers toured Columbia recovery sites in East Texas during the last week in March, boosting the morale of search and recovery workers.

The group visited the sites and participated in the search to view the progress of the work and to cheer on workers in the field who are recovering and safeguarding pieces of the orbiter.

"When I went to Texas to visit our NASA KSC Team of approximately 250 people, representing our civil service and contractor workforce, I found that we

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Schirra, Lovell cheer KSC workers

Former astronauts Jim Lovell and Wally Schirra spoke to KSC employees March 3, offering encouragement to workers to help get the space program "back on its feet."

Through all their comments ran a theme of wonder at the scientific knowledge and ability of workers to work together to accomplish the feats of putting men and women into orbit and on the moon.

They stressed it would take that kind of coordinated effort to find and fix the problem encountered by Columbia on its last mission.

Said Lovell, "In our present problem, we've got to look for a solution, fix it and then continue.... This is sometimes risky business, but the rewards that we get, the work that we do, the innovations and the technology ... that spills over to the private sector, are worth the risk."

Center Director Roy Bridges Jr. recounted highlights of their NASA careers, especially Gemini 6/7 and Apollo 13 launches, both of which included unexpected events and near catastrophes.

Lovell stated, "Things don't always work the way you think they're going to work and the only way to overcome the problems is to work hard and find the solutions to fix the problem and continue. That was true on Gemini 6/7.

Schirra recalled Gemini 6, and having to wait for another launch attempt after an Agena rocket exploded (see sidebar).

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Astronauts Jim Lovell and Wally Schirra give a thumbs up to KSC employees during their March 3 visit.

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GALEX launch to be determined

The Galaxy Evolution Explorer (GALEX) will take flight from Cape Canaveral for launch over the Atlantic Ocean on a launch date yet to be determined at press time.

GALEX is designed to be an orbiting space telescope that will observe galaxies in ultraviolet light across 10 billion years of cosmic history.

Such observations will tell scientists how galaxies, the basic structures of our universe, evolve and change.

Additionally, GALEX will probe the causes of star formation during a period when most of the stars and

(See GALEX, Page 8)



NASA's Galaxy Evolution Explorer spacecraft is successfully rotated to horizontal in preparation for mating with the Pegasus XL launch vehicle. The GALEX, which will launch from Cape Canaveral Air Force Station, will carry into space an orbiting telescope that will observe a million galaxies across 10 billion years of cosmic history.

Recognizing Our People

Parrish appointed to Inventions and Contributions Board

NASA Administrator Sean O'Keefe has appointed three new members to the Inventions and Contributions Board (ICB): Dr. Clyde Parrish, Dr. Biliyar Bhat and Dr. Donald Braun.

The ICB, chaired by the chief engineer, +Theron Bradley, was established in 1958 under the Space Act that created NASA.

The board is comprised of more than a dozen scientists and engineers representing the many technical disciplines involved in NASA research and development. The ICB has statutory responsibility to recommend to the administrator the granting of waivers to property rights in inventions and to recommend an individual monetary award for significant scientific and technical contributions to NASA's aeronautical and space activities.

The ICB's work provides an important incentive to NASA employees as well as our industry and academic partners to contribute to "Innovation... As Only NASA Can."

Kennedy Space Center's Dr. Parrish brings to the ICB's deliberations considerable expertise



from his current endeavors in experimental chemistry and his setup of production scale chemical processes while working in industry. Dr. Parrish also has almost two decades in academics instructing at the graduate level which will serve the ICB well as NASA moves to "Inspire the next generation of explorers."

In addition, Dr. Parrish has more than a dozen patents, more than 100 publications and journal articles, and won the NASA Commercial Invention of the Year in 2000 for his process that converts launch gas waste products to fertilizer. Dr. Parrish is currently a senior chemist at KSC in Spaceport Technology Development.

Dr. Bhat's appointment will give the ICB significant expertise in the area of advanced metallic materials as well as welding and allied processes, particularly as they pertain to the

future propulsion and launch systems NASA requires to move to the next generation systems necessary "To explore the universe and search for life."

Dr. Bhat currently heads the Metallurgy Research Team at the NASA Marshall Space Flight Center in Huntsville, Ala., and is representing NASA's space transportation systems to DOD as partnerships are developed with their space launch programs.

Dr. Braun's skills in scientific computer programming and in experimental data signal processing will bring much needed expertise in these areas to the ICB. Dr. Braun's designs for systems that evaluate and find solutions for the adverse effects of icing on airfoils provide a major contribution to NASA's civil aviation efforts as we seek "To understand and protect our home planet."

Dr. Braun is a computer engineer at the NASA Glenn Research Center at Lewis Field in Cleveland, Ohio, where he is the Center expert in digital signal processing.



March Employees of the Month

March Employees of the Month from left are Paul Davis, ISS/Payloads Processing; Timothy Freeland, Procurement Office; Kyle Longstreth, Shuttle Processing; Betty Kegley, Executive Staff; Wayne Kee, Spaceport Services; Donald Pittman, Spaceport Engineering & Technology. Not shown are Amber Hufft, Office of the Chief Counsel; Charles Gambaro, Cape Canaveral Spaceport Management Office; Cheryle Mako, ELV & Payload Carriers Programs.

Kissiah inducted into Hall of Fame

The Space Foundation recently announced the selection of the largest group of inductees in the 15-year history of the Space Technology Hall of Fame.

This year's Hall of Fame space technologies run the gamut – from a medical implant that helps thousands of Americans hear better to a device for disarming mine fields.

The six technologies being inducted this year are cochlear implant, digital latching valve, humanitarian demining device, monolithic microwave integrated circuit technology, virtual window, and VisiScreen.

Adam Kissiah, Jr., a retired NASA Kennedy Space Center engineer developed the technology for the cochlear omplant, a digital implantable hearing aid, using the skills and knowledge he acquired from work on the Space Shuttle program, particularly electronic sensing systems, telemetry, and sounds and vibrations sensors. The Cochlear Implant Association estimates more than 66,000 patients have received an implant in this \$1.65 billion industry.

The Space Foundation will honor the technologies and innovators during the Space Technology Hall of Fame 15th Anniversary Awards Dinner April 10.

The Space Foundation, in cooperation with NASA, established the Space Technology Hall of Fame in 1988 to honor the innovators who have transformed space technology into commercial products, to increase public awareness of the benefits of space spin-off technology and to encourage further innovation.

Manager of Year nominations sought

The Florida Space Coast Council (FSCC) of the National Management Association (NMA) is sponsoring the Brevard County Manager of the Year Award and needs your nominations.

This prestigious award will be presented at the FSCC NMA Awards Banquet during Management Week in Florida in conjunction with Management Week in America (June 2-7).

This provides an excellent opportunity to recognize the significant achievements of a manager/leader within your organization.

The recipient is selected by a panel comprising leaders from areas such as news, banking, education, medical and business.

Visit the FSSC Web site at www.fscnma.org for instructions. For further information, contact Mike Woolley at (321) 730-5518. Nominations must be submitted by March 26.

NASA KSC seeks VPP Star rating

Contractors also pursue designation

To exceed the required commitment to safety and health initiatives at Kennedy Space Center, the Center is working to achieve the Voluntary Protection Program (VPP) Star rating.

VPP is a national program sponsored by the Occupational Safety and Health Administration (OSHA) which recognizes and promotes effective safety and health management.

VPP is a Centerwide initiative that is supported by NASA.

Currently Langley Research Center, Hampton, Va.; Johnson Space Center, Houston, Texas; JSC White Sands Test Facility, Las Cruces, N.M.; and Ames Research Center, Moffett Field, Calif., are VPP sites, and several other Centers are in varying degrees of VPP readiness.

Several KSC contractors are also pursuing VPP certification.

Boeing Payload Services is working toward having an application ready in early 2004. Space Gateway Support and United Space Alliance are already VPP sites with OSHA scheduled to reaudit them May 12-23.

According to Dave Facemire, NASA-KSC's VPP program manager, the VPP application was completed and sent to OSHA in late February.

An outside review of the NASA KSC Safety and Health Program was conducted in December by STAR Consultants, a company with a good record of helping organizations prepare for obtaining VPP status.

"The review was very complimentary of our efforts and recognized that we have many programs that are on the forefront in safety and health," said Facemire. "This program has allowed us to make positive improvements. It's taken the Safety and Health Program from one where safety was done for you, to a program that is owned by all employees and managers."

"KSC is using the OSHA VPP program as the impetus to completely review its safety program, correct deficiencies and make major improvements," said Humberto Garrido, associate director, Safety and Mission Assurance, in the Safety, Health and Independent Assessment Directorate. "OSHA's VPP is the tool our center director has chosen to build a world class safety and health program at KSC.

"This effort will require everyone's active participation – civil servants, contractors, unions, supervisors and management."

A team consisting of about 15 percent of the NASA KSC workforce has been involved in efforts to improve the safety and health programs.

Currently, about 55 of the 250 potential program improvements remain to be addressed prior to the next milestone—OSHA's audit of the program at KSC is scheduled for July 7-11.

"VPP implementation will indeed demonstrate KSC's commitment to its first guiding principle, Safety and Health First," Garrido added.

"Our continued success with all of our operations and endeavors is tied very closely to our entire team understanding the hazards of their jobs and the controls necessary to ensure an accident-free environment," said Center Director Roy Bridges Jr.

"At KSC, we need every employee focused on safety and health issues. VPP helps us to do that by its requirement to get each of you involved in identifying and controlling hazards before we hurt someone."

For VPP information visit: <http://kscsafety.ksc.nasa.gov/vpppage.htm>; <http://kscsafety.ksc.nasa.gov/svipage.htm>; <http://www.osha.gov/oshprogs/vpp>; <http://usago1.ksc.nasa.gov/hq/vpp>; or <http://sgs.ksc.nasa.gov/safety/safety/vpp/vpp.html>

Toastmasters host contest

The KSC Club International Speech and Table Topics Contests were held Feb. 26 at KSC Headquarters. KSC Toastmasters President Dr. Francis Merceret, pictured at the podium, addresses the group during the contest. The winners of the 2003 KSC Spring Contests were Jose Amador for International Speech and Doresa Perry for Table Topics. They will represent the local chapter at the Area 11 Contest April 5 from 9:30 a.m. to 12:30 p.m. at the Cocoa Beach Library.



By Anita Barrett

In March 1955, the Eisenhower Administration supported the International Geophysical Year (IGY), which extended from July 1, 1957, through December 31, 1958, by approving a plan to orbit a series of instrumented Earth satellites.

The IGY was an international effort to advance scientific studies of Earth. This effort was the first not tied to a weapons system. From it would emerge Vanguard 1, launched 45 years ago on March 17, 1958.

The Vanguard 1 would carry a tiny 3.25-pound, 6.4-inch-diameter spherical tracking satellite made of aluminum to study the effects of the environment on a satellite and its systems in Earth orbit. It also was to be used to obtain geodetic measurements through orbit analysis.

Needing to determine what rockets and satellites would be launched, a committee under Donald Quarles was formed.

Quarles was assistant secretary of defense for research and development. He formed the Advisory Group on Special Capabilities, later known as the Stewart Committee for its chairman, Homer J. Stewart. The eight members represented the Army, Navy, Air Force and Defense. The three options presented were a multi-stage version of the Army's Redstone missile as a booster; a multi-stage version of the Navy's Viking research rocket, later known as the Vanguard; and the Air Force's Atlas missile.

Vanguard was selected in August 1955. The Viking rocket had already proved its ability to carry an 852-pound payload 158 miles into space, when the Navy launched it May 24, 1954.

Objectives of Project Vanguard were to develop and procure a satellite-launching vehicle; to place at least one satellite in orbit around the earth during IGY; to accomplish one scientific experiment; and to track flight to demonstrate the satellite actually attained orbit. The latter was especially important.



The Vanguard rocket was designed as a three-stage vehicle using a modified Viking rocket as first stage, an Aerojet second stage and a solid-fueled Altair third stage. The Martin Company was the prime contractor.

"[After] the Navy got the go ahead . . . it didn't leave much time, especially with no priority," said John Neilon, who was a member of the Data Processing Section of the Vanguard Operations Group (VOG). His principal job was getting radar installed and ensuring successful operation.

"They had no facilities at Cape Canaveral and were competing for services with people who did have them. However, in a remarkable instance of inter-service cooperation, facilities were found (not always deluxe) and the Air Force agreed to share Complex 18, which was a two-pad complex being built for the Thor program."

Another member of the VOG was Don Sheppard, who was in the Electronic Instrumentation Branch at the Naval Research Laboratory and came to Cape Canaveral with the VOG in 1956.

"I had the first stage telemetry transmitter which was essential for evaluating performance of the rocket," said Sheppard. "My job included procurement, testing, preparing it for flight and installing it in the launch vehicle on the launch pad. During tests and launch countdowns, I was in the blockhouse to operate the telemetry equipment on ground power and switch to internal power before

Remembering Our Heritage



John Neilon (left) works the console at Patrick Air Force Base, tracking the launch vehicle. Neilon was with the Data Processing Section of the Vanguard Operations Group for Vanguard 1.

flight."

Skip Mackey was another young engineer working on Vanguard. On active duty with the Navy, he was assigned to the project as a telemetry engineer. Conditions were very different back then, and shortage of personnel required unusual steps, which he recalls: "I would get a telemetry package from NRL, unpack it, check it out, tune it up, seal it up for flight, pressurize it, load it into a jeep, run it to the complex, tell the complex manager that I had to install it in the vehicle, drive to the pad, unbolt the cover plate on the vehicle, install and hook up the transmitter, bolt the cover plate back into place, go to the blockhouse, turn on the telemetry ground station, get radio

clearance, turn the transmitter on, verify its performance, turn it off, shut the station down and report to the complex manager that it was ready for flight. All by myself, with no one else watching, and no paperwork. Interestingly, they all worked fine in flight!"

Six test launches were scheduled for the Vanguard. Development problems postponed the first until Dec. 8, 1956. A second test launch occurred May 1, 1957. A third test occurred Oct. 23, 1957, just weeks after Russia launched Sputnik I.

"The Sputnik was a real disappointment to us but of course we kept working," said John Neilon. "The Sputnik . . . changed the ground rules for what had been a scientific program into one where

45 years ago: Vanguard I launches



Group shot: Members of the Vanguard Operations Group representing the Navy and Naval Research Lab. Kneeling in front are Skip Mackey (fifth from left) and Don Sheppard (sixth from left). In the second row are John Neilon (fourth from left), Don Mazur (eighth from left), and Helen Evans (second from right).

national prestige was involved. Schedules became more important and other agencies were pressed into service to launch satellites.”

Skip Mackey remembers being stunned and somewhat disbelieving. “I remember setting up a makeshift antenna on the roof of Hangar S to prove to ourselves that it was real. I remember the first pass, when the characteristic ‘beep-beep-beep’ came out of the receiver. We all had tears in our eyes. It was real all right.”

Helen Evans, a secretary with the Vanguard Operations Group, also remembers the effect of the Sputnik launch on morale. “We were all blue. But we knew we would ‘show them’ when we launched Vanguard and so just kept working.”

With another Russian launch of Sputnik II in November, the decision was made to attempt to launch a satellite into orbit around the Earth on the next available Vanguard, known as TV-3.

On Dec. 6, 1957, TV-3 exploded on Cape Canaveral Launch Pad 18A

about 2 seconds after liftoff. A second failure occurred Feb. 5, 1958. Finally, TV-4, carrying the Vanguard-1 satellite, lifted into orbit March 17, 1958.

Still, there was a tense couple of hours waiting for the signal that the satellite was working.

“We had the long wait to see if the satellite was actually in orbit,” said Sheppard. “A nominal orbit would have a period of about 90 minutes but that time came and went and we were thinking ‘oh-oh.’ But finally the signal was received – quite a bit later because we had achieved a 2,000-mile apogee and an orbit that would last for hundreds of years. So there was great joy in Mudville after all.”

Neilon remembers the wait as well. “My battle station was at Patrick AFB at the AN/FPS-16 radar. Since we were tracking the vehicle, I knew that all was going well when it went over the horizon, but a lot can happen from there until orbit is achieved. I drove the 20 or so miles from Patrick to

Hangar S at the Cape where the whole team was assembled waiting word. We were getting pretty edgy because we had no word by the time the signal should have been picked up in California. (Tracking systems in those days weren’t anywhere near as sophisticated as they are today.) After what seemed like an eternity, Dan Mazur, the manager of the Vanguard Operations Group, came in. . . after receiving a phone call and announced, with a big smile on his face, ‘They have it on the yagi in San Diego.’ (The yagi is a tracking antenna.) I honestly don’t recall whether the cheers were louder than the sighs of relief but there were plenty of both.”

Vanguard was the first U.S. rocket designed for the specific purpose of launching satellites, and represented the first program on Cape Canaveral that was not tied to a weapons system.

It was also the first use of solar cells for power in space. While it carried no experiments per se, the

solar powered transmitters on board allowed for precise tracking which led to the discovery that the earth is pear shaped. In all, three were successfully launched from Cape Canaveral.

Original estimates had Vanguard’s orbit lasting for 2,000 years. Later that estimate was changed to 1,000. But it was discovered that solar radiation pressure and atmospheric drag during high levels of solar activity decreased its expected lifetime to only about 240 years. The battery-powered transmitter stopped operating in June 1958 when the batteries ran down. The solar-powered transmitter operated until May 1964 (when the last signals were received in Quito, Ecuador) after which the spacecraft was optically tracked from Earth.

Vanguard was not the first U.S. satellite to reach space, however. The Army Ballistic Missile Agency successfully launched Explorer I aboard a four-stage version of its Redstone missile Jan. 31, 1958.

TEXAS ...

(Continued from Page 1)

were integrated into an organization of about 5,300 people at Lufkin and four remote sites. Most of these were from the U.S. Forest Service, but many other federal agencies are represented by smaller numbers," Bridges said. "All are working long hours in extremely harsh conditions and living in less than ideal quarters in many cases. They are all making a significant difference in our return to flight. They come from all over the United States. What a great 'All American' Team!"

About 40-50 KSC workers from NASA, United Space Alliance, the Boeing Co. and Space Gateway Support rotate in and out of the recovery team every week, said KSC Launch Manager Ed Mango, who is serving as KSC recovery director.

The Mishap Investigation Team (MIT) is coordinating the recovery efforts out of the Lufkin Command Center. Johnson Space Center NASA and contractor workers are in the field, but the lion's share of the recovery support from the space program is being provided by KSC.

"We have our KSC technicians, engineers and quality and safety workers in the field because they are familiar with the Shuttle and can identify the parts and alert other recovery team members of potential hazards," Mango said.

Mango is one of a number of KSC representatives who have been working at the field sites and command center since Feb. 1.

About 3,200 Forest Service Firefighters and 400 Environmental Protection Agency (EPA) workers comprise most of the other personnel supporting the search and recovery effort. Firefighters are providing ground searches in the fields, with the EPA workers supporting the firefighters and the collection at field sites.

Space program workers accompany lines of firefighter searchers through the briar-filled woods to identify Shuttle parts and pieces as they are found and to advise the search team on potential dangers. Space program workers also are supporting helicopter-based search efforts.



Roy Bridges Jr. and senior Kennedy Space Center managers visited Columbia search and recovery workers in the field March 27-29 to help boost their morale. At left (from left), Gerry Schumann, Safety & Process Assurance Branch of the Shuttle Processing Directorate; Roy Bridges Jr., KSC director; and Mike Butchko, president of Space Gateway Support, are briefed on the mapping and the search process that they will be supporting in the Sabine National Forest. Above, the team briefing is held in the Sabine National Forest (Bridges and Butchko pictured at right) prior to the morning search.

The hours are long for all of the recovery workers and managers. Line workers walk the woods in rain and cold temperatures from dawn to dusk seven days a week. Those staffing the command center pull 12- to 14-hour days.

Security workers guard retrieved pieces in shifts around the clock at the East Texas field sites at Hemphill, Nacogdoches, Corsicana and Palestine and at the Barksdale, La., collection site before they are shipped to KSC.

Bridges' visit greatly boosted morale of all the workers because it showed them he cares about what's being done in the field and appreciates their efforts, Mango said. The firefighters especially were impressed that Bridges took time to make the visit.

"The firefighters were greatly enthused and that helps psyche up the rest of us," Mango said. "In

general they are thrilled to be helping us get Columbia home. Many of the firefighters are Native Americans and some of them do a sort of victory/celebration chant whenever a large piece is found. They feel, and we believe, that every piece we find helps keep the space program going."

Accompanying Bridges on the trip were David Culp, Don Myrick, Steve Minute, Doug Lyons, Bill Dowdell, Charlie Abner, Mike Butchko, Bob Herman, Chuck Fontana and John Elbon. The group left KSC for Lufkin, Texas, March 27. The following day they visited the Hemphill, Nacogdoches, Corsicana and Palestine field sites and then returned to KSC on the third day of the trip.

"The welcome we received from the recovery teams in East Texas was overwhelming," said Culp, who

is serving as Bridges' intern. "It was a reminder of how much the public greatly values and supports the space program."

Many members of the public, including those from the East Texas area, have sent messages of support to members of the space program. A letter from a Nacogdoches resident, which was given to Bridges during his visit, shows her shared grief over the Columbia tragedy: "... I'm proud of us as a country and as a nation, that we can collectively mourn for seven people we have never met who had the courage to take the risks few of us would dare attempt. I'm proud that we will take the time to bow our heads in honor of these seven and treat them with the dignity they deserve. I'm also proud of the fact that we have gone on, as we did after 9/11. ... That we have once again not allowed tragedy to immobilize us. ..."

MORALE ...

(Continued from Page 1)

Lovell said Apollo 8 was the high point of his career, recognizing “how great it was to work with the kind of people who can get us to the moon.

“On Apollo 13 we learned something different,” he added. “We had the opportunity to work together [from space and on the ground] to face the crisis and get us back from an almost catastrophic situation.”

Bridges then asked for questions, starting with one of his own. Following are excerpts of the astronauts responses:

Q. People question whether the human space program is valuable. Do you have a perspective on that you would like to share?

A. Lovell: *That has been asked since NASA became NASA. [As to the cost] we do not spend one cent in space, we spend it ALL here on Earth. You are in a creative program. You bring something back to the people whose tax money is supporting you. The money spent by industry and contractors comes back to the government in the form of taxes, either individual or corporate. The space program has done more to get people interested in education than any other program.*

Schirra: *“To go higher, farther and faster” than anyone else was our goal. We did and we can. We are all enthused about what you can do to get the program back on its feet.*

Q. Was there ever a time you doubted you’d be coming back (from Apollo 13)?

A. Lovell: *No. We thought what do we have to operate with and what can we do to get us back home. As we worked with the ground looking at one crisis after another. . . that and a little bit of faith kept our confidence going that we’d overcome this particular catastrophe and get us back home.*

Q. What would you tell the youth today if they want to become astronauts?

A. Schirra: *Study the basic sciences. . . and make a commitment to study and learn. It’s the*



In the RLV Hangar, looking over a piece of Columbia debris are (from left) Launch Director Mike Leinbach, Acting Deputy Director of External Relations & Business Development Lisa Malone, Space Shuttle Test Director Steve Altemus, reconstruction engineer John Cowart, and former astronauts Wally Schirra and Jim Lovell. The latter two visited several sites, encouraging workers to help get the space program “back on its feet.”

commitment that keeps you going. We have to keep the enthusiasm of going to space alive and they in turn will be enthused about learning how to go there.

Q. What are your perceptions of the public’s reaction to this mishap with Columbia?

A. Lovell: *I was at the airport. . . when the news came and there wasn’t a sense of resignation because we have been so successful. Just loss. The public had become complacent with the routine of space launches, but every once in a while it comes back to remind us that this is a risky business. Everyone I talk to says this should not stop the program, we should find out the cause. We have an obligation now not just to our own country but our international partners.*

Q. Would there be any benefit to going back to the moon or other planets, or just focus on the benefits of low-Earth orbit, like the Space Station?

A. Schirra: *It’s the same thought that I talked about, going higher, farther and faster. I don’t want to limit the “farther” in our original vision. It’s going to take a lot of work to develop new technology and new propulsion systems. And if we can go faster we can go to Mars. A committed team, which*

we’ve already seen your a part of, can show the world we are not handicapped in staying here.

Q. Can you tell us what it’s like seeing the Earth from space?

A. Lovell: *The Earth is a small object... hold up your thumb and you can hide the Earth behind it. It’s a very small, insignificant planet and we have limited resources. We must learn how to utilize them. It is the most beautiful thing you can see from the moon – which is nothing but gray. You can see the blues of the oceans, the cloud covers, and the pinks, salmons and browns of the ground below.*

Q. Do you have any ideas of how we should proceed in the way of future space vehicles?

A. Schirra: *We have to tell our story better, convince the public and politicians that we are in a business we are serious about. . . and sell NASA to the people, press corps and advertisers.*

Lovell: *We’re down to three orbiters and we have a program that requires us to support the International Space Station. We have to look seriously at developing a new Earth-to-low-Earth orbit transportation system. Either improve the present orbiter or a new approach. We have to have something that will take more than three people [to the*

Station]... to keep that work going.

Their last words to the KSC team were “Do good work,” (Schirra, quoting Gus Grissom) and “We have a great program. Keep charging. Don’t give up” (Lovell).

Go to the KSC Internal Home Page <http://www.ksc.nasa.gov/nasa-only/internal.html> to view the full video.

Agena problem bumped Gemini 6 to after Gemini 7

Gemini 6 was scheduled to be launched before Gemini 7 (with astronaut Jim Lovell aboard) and rendezvous with another unmanned target.

An Agena rocket had been modified for use as a target vehicle for the planned orbital rendezvous and docking tests, but the unmanned rocket exploded shortly after liftoff

G-6 was immediately postponed and rescheduled to follow the Gemini 7 into space and rendezvous with it.

This was the first ever close rendezvous of two manned spacecraft.

GALEX ...

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elements we see today had their origins.

Led by the California Institute of Technology, GALEX will conduct several first-of-a-kind sky surveys, including an extra-galactic (beyond our galaxy) ultraviolet all-sky survey.

During its 29-month mission GALEX will produce the first comprehensive map of a universe of galaxies under construction, bringing us closer to understanding how galaxies like our own Milky Way were formed.

GALEX will also identify celestial objects for further study with ongoing and future missions.

GALEX data will populate a large, unprecedented archive available to the entire astronomical community and to the general public.

Scientists would like to understand when the stars that we see today and the chemical elements that make up our Milky Way galaxy were formed.

With its ultraviolet observations, GALEX will fill in one of the key pieces of this puzzle.

GALEX is a small explorer class mission that is part of NASA's structure and evolution of the universe theme.

These are relatively inexpensive science missions that typically weigh approximately 500 pounds or less. GALEX will be launched by a Pegasus XL rocket and will orbit 428 miles above Earth for 29 months.

Visitor Complex hosts special exhibits

Guests at Kennedy Space Center Visitor Complex can celebrate the 100th anniversary of powered flight by glimpsing both the history of human flight – a replica of man's first powered flight vehicle, the Wright Flyer – as well as an interactive exhibit featuring one of mankind's greatest technological achievements to date, the International Space Station.

Both the Wright Flyer Replica and "Space Station Imagination" exhibits are included with admission to the Visitor Complex.

Nearly 100 years after the dawn of powered flight, a highly authentic replica of the Wright Flyer, the plane that launched a century of technological advances, launches a journey of its own.

The American Institute of Aeronautics and Astronautics (AIAA) 1903 Wright Flyer, the result of a 20-year effort to faithfully reproduce Orville and Wilbur Wright's historic biplane, will visit 10 destinations nationwide and be seen by an estimated two-million people.

The tour is sponsored by the AIAA as part of its "Evolution of Flight" centennial celebration.

The replica will be on display in the west wing of the IMAX® Theater at the Visitor Complex through May 10.

The first full-scale replica of the 1903 Wright Flyer, and the only one to be wind-tunnel-tested, the AIAA Flyer is a virtual museum of the Wrights' groundbreaking work.

Among other distinctions, the



The Wright Flyer Replica (above) and "Space Station Imagination" are two new temporary exhibits at the KSC Visitor Complex.

650-pound plane was built using drawings from the Smithsonian's National Air and Space Museum, where the original is on display.

Later, rigorous wind tunnel tests conducted at NASA Ames Research Center allowed experienced pilots to virtually simulate the nearly impossible conditions of that initial flight.

On exhibit through March 24 is a special International Space Station exhibit. Johnson Space Center has brought the exhibit, which will give visitors the opportunity to feel what it's like to live in space on board the International Space Station.

Visitors will board an interactive display and catch a glimpse of how astronauts live and work on board the space station.

"Space Station Imagination" comprises two 48-foot trailers,

linked in an L-shape to form two modules of the space station: the Habitation Module, or living quarters, where the astronauts sleep, eat and tend to personal hygiene; and the Laboratory Module, where multiple microgravity experiments are performed.

Visitors do not see exact replicas of what the modules would look like, but rather examples of features of these two modules.

Animatronics "astronaut" Dr. Emily greets visitors to the exhibit as she awakens to start her day on board this international orbiting laboratory.

Displays show how a space toilet and shower work like vacuum cleaners with very little gravity, as well as how astronauts eat and sleep aboard the space station.

All-American Picnic April 26

The KSC All-American Picnic will be held Saturday, April 26, from 10 a.m. to 4 p.m. at KARS I.

All KSC employees and their families are invited to attend. Activities planned include a Car Show, the Annual Chili Cook-Off, exciting exhibits and entertainment, children's activities and family sports, and, of course, food!

Patrick Breen, ISS/Payloads Processing Directorate, and Roy Tarpe, Boeing, are co-chairs for planning this year's event.

Volunteers are needed to support all activities at the picnic. If you would like to volunteer, please contact Mark Biesack at 321-867-6288.

Look for additional information in upcoming *Spaceport News*, *KSC Daily News*, *KSC Countdown* and contractor newsletters.



John F. Kennedy Space Center

Spaceport News

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